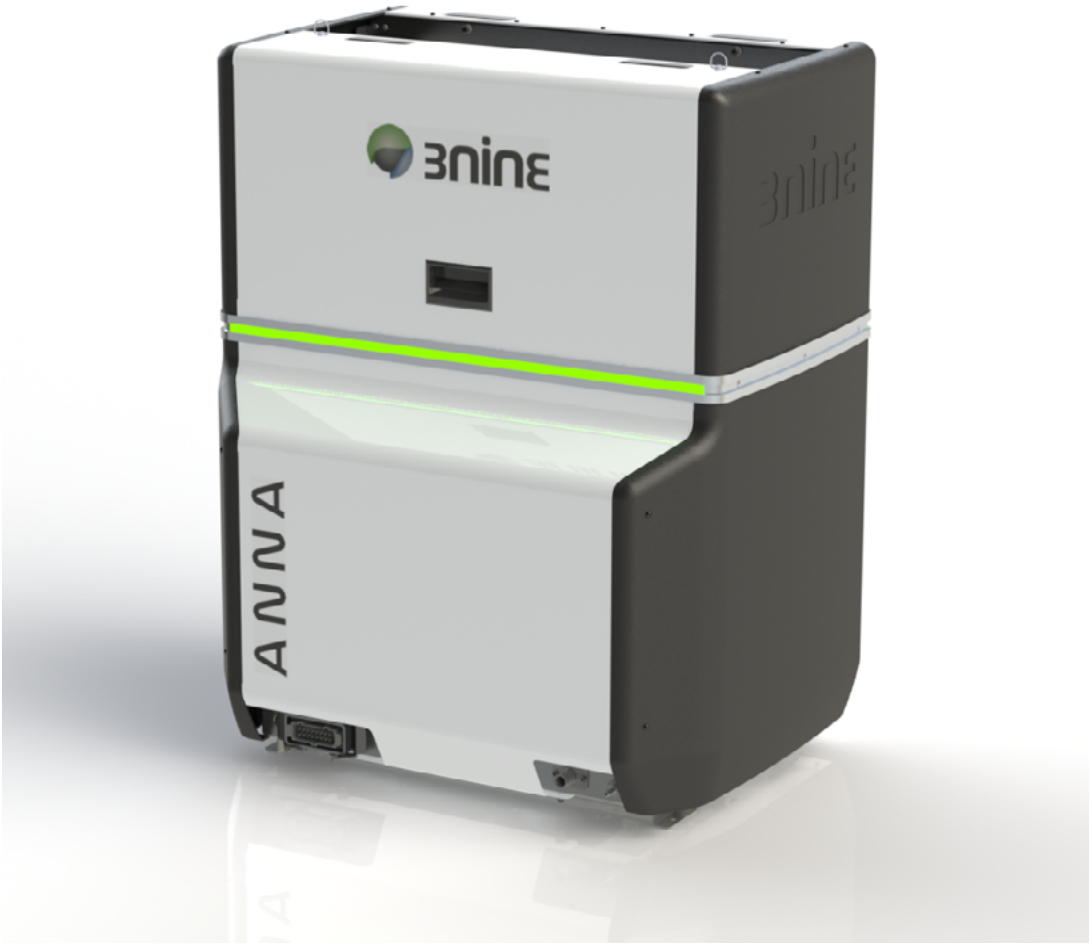
600 ANNA

English

Translation of the original instructions



3nine

English

Confirmation of compliance in accordance with Appendix 2:1 A

3nine AB (556572-4167), Box 1163, 131 27 Nacka Strand, declares that
Oil Mist Separator Anna 600
has been manufactured in accordance with the following directive:

- 2004/108/EG EMC Directive Electromagnetic Compatibility (EMC-directive)
- 2006/95/EG/EC Low Voltage Directive (LVD)
- 2006/42/EC Machine Directive

has been manufactured in accordance with the following harmonised standards, or parts therefore:

- EN ISO 12100
- EN ISO 60204-1
- ISO 14120

Nacka Strand, 7.1. 2013 Oskar Olai CEO, Legal Officer
3nine AB, Box 1163, 131 27 Nacka Strand, Sweden

Dr Claes Inge
Technical Documentation Officer

About this manual

This document contains information which belongs to 3nine AB. No part of this publication may be copied, stored in information recovery systems, or transmitted in any form or in any manner, electronically or mechanically, including photocopying and recording, without the prior permission of 3nine AB.

Title: User Manual Anna 600
Language: English
Version: Version 1 (2013-01)

This manual is published by 3nine AB with no guarantees. Improvements and amendments to this manual due to typographical errors, mistakes or modifications to machines or equipment may be made by 3nine AB at any time and without prior notice. However, such changes will be implemented in the next version of this manual.
All dimensions stated are in millimetres unless specified otherwise.

All rights reserved

©3nine AB, 2013

Publication number: 800-044-EN

Printed in Sweden

Health and safety rules

This manual contains instructions intended for users' daily work with the equipment.

This manual must always be available to the individual or individuals working with the equipment.
It is important to ensure that:

- The manual and other applicable documents are retained for the entire service life of the equipment.
- The manual and other applicable documents are included as part of the equipment.
- This manual is passed on to other users of the equipment.
- This manual is updated if any supplements or amendments to the equipment take place.
- This manual describes the methods applied when using the equipment.

Safety code

- Before you start using the equipment and carrying out maintenance or servicing on this equipment, please read through the applicable parts of the instruction.
- Observe all Danger, Warning and Note symbols shown in the manual. Serious damage to machinery and injury to persons may result from failing to observe this information.
- Assume all electrical equipment is live.
- Assume all hoses and pipelines are pressurised.
- When servicing and maintaining the equipment/machine, ensure that the electrical supply and the pressurised pipes are cut off and that the fuses are tripped. The machine must be pressure free and the electric plug must be disconnected. Wait at least five minutes and check that rotating parts have completely stopped.
- Servicing and maintenance must be carried out by authorised service and maintenance staff only.
- Follow the instructions regarding max. load, pressure and operating temperature: see the decal on the equipment and technical data in the manual.
- Use only spare parts approved by 3nine – if you are uncertain, contact 3nine technical support.
- Make sure that the machine is securely mounted and installed in accordance with instructions before starting it.
- Regularly check the machine's screws and other attachment devices.
- Use the machine only for the intended use.
- In the event of abnormal vibration or noise – stop the machine and consult the manual.
- Electrical installation must be carried out by an authorised electrician only.

Warning devices

Warning devices and protective devices must be checked annually.

Warning texts

Danger, Warning and Note texts have the following meanings in this manual (see the illustrations below).

NOTE!

Note – Important information concerning operation, function, care or maintenance of the oil mist separator

WARNING!

Warning – Important information to prevent damage to the machine or impaired oil mist separator function.

DANGER!

Danger – Indicates a risk of serious injury

Machine safety

The machine is labeled with the CE label, which means that the machine and its associated documentation meet the requirements of the Machine Directive, Annex V.

Conversion of the machine

If the machine is converted or supplemented with parts that the manufacturer does not approve, this declaration of conformity will not apply to the parts which alter the function of the machine. Warning decals and the identification plate on the machine must be clearly visible. If any part of the machine bearing a warning decal is replaced, new warning decals must be applied in the same place as before.
Damaged decals and identification plates must be replaced immediately.
If the machine is converted or added to, it is very important to ensure that this instruction is completed/adjusted immediately to include the necessary illustrations, photographs and texts.

Demands on staff

To prevent personal injury and damage to the machine, operating staff must receive special instructions or training in accordance with the manufacturer's manual. Operating staff may only handle the parts for which they have received instructions or training.

Manufacturer

This machine has been manufactured by:

3nine AB
Box 1163
131 27 Nacka Strand
Sweden
Tel.: +46 8 601 35 40
Fax: +46 8 601 35 41

Machine identity

The Machine's identity plate with serial number and CE label is placed on the inside of the service hatch.

Fig. 1 Identity plate

General

Area of application

The machine has been designed and is intended for the separation of oil mist (cutting fluid/coolant) in workshop environments and may not be used for other purposes. Incorrect operation or maintenance may result in damage to the unit. The machine must be installed in a closed system with dedicated extraction space.

System description

Contaminated air is continuously sucked in through inlet (A) and flows through the separation unit (B) which rotates and separates the fluid drops from the flow of gas. The rotating separation units are powered by an electric motor (C) and drive belt (D). The fluid drops are collected and continuously removed from the machine via fluid outlet (E).
The fluid can be returned to the oil or cooling fluid tank, or collected in a separate container.
The clean air is returned to the premises through a HEPA filter (F).
The machine is also provided with a nozzle and pipe (G) for the connection of a CIP cleaning system.

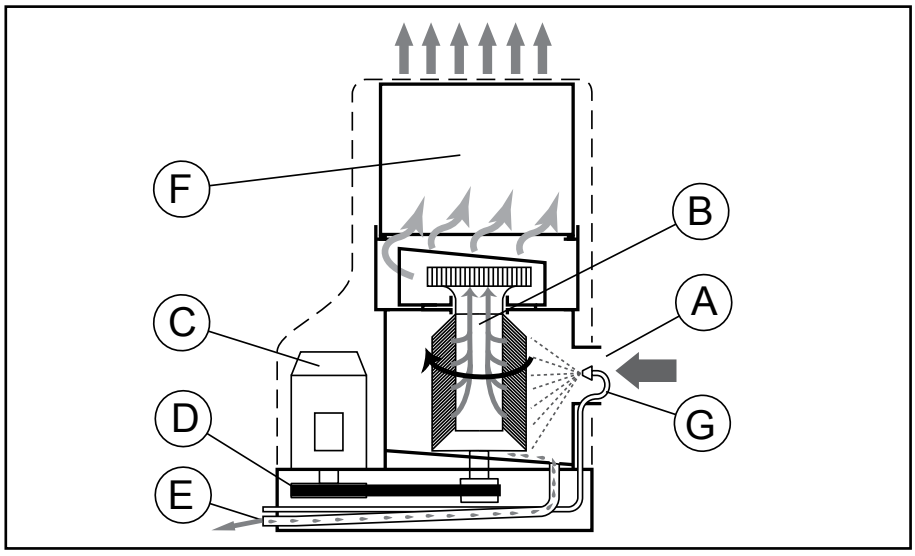


Fig. 2 Basic diagram, Anna

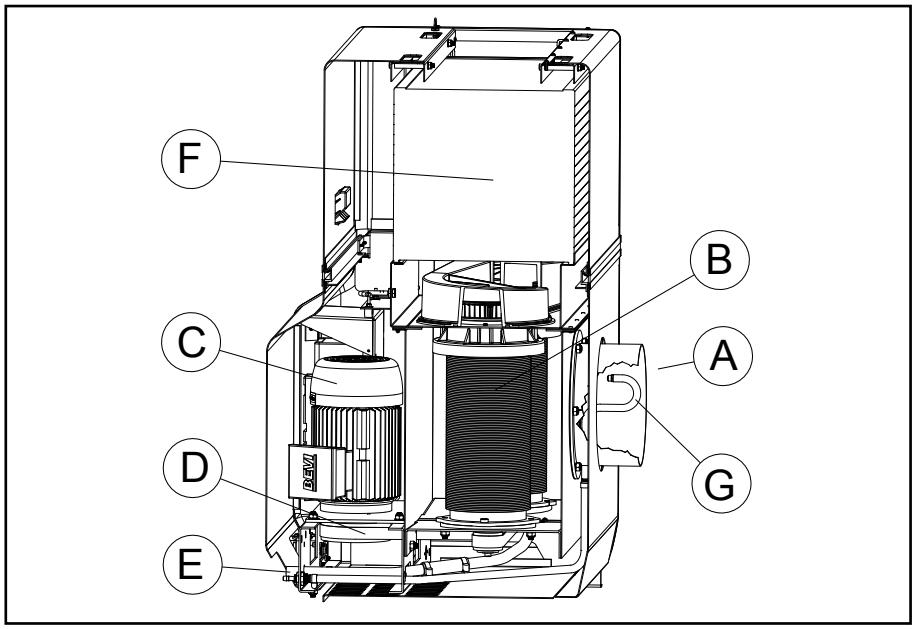


Fig. 3 Cross-section view of the Anna

Dimensions

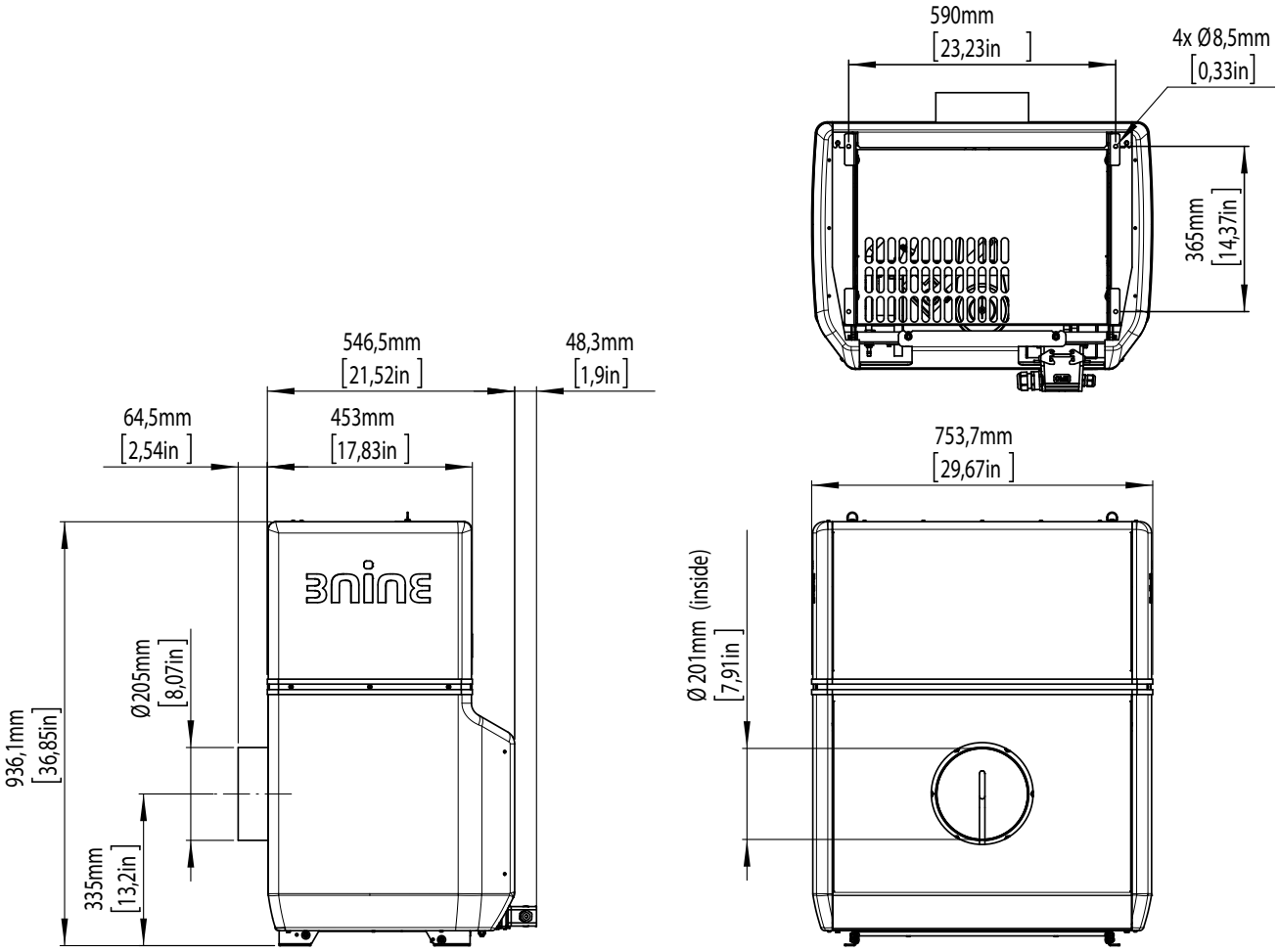


Fig. 4 Dimensions, Anna

Technical data:

Model name: ..... Anna 600
Flow: 0-600 m3/hour
Operating temperature (process air) ..... 5-50 °C
Power supply (EU+US): 3-phase 380-480V 50/60Hz 6A
Power supply (US): 3-phase 208-240V 50/60Hz 6A
Motor capacity: ..... 0.75 kW
Rated current (EU+US): ..... 1.9 A
Rated current (US): ..... 3.3 A
Rotor rpm: ..... 6700 rpm
Weight: ..... 77 kg
Noise: ..... <70 dBA

English

Before starting

Installation

The information manual supplied describes the installation of the machine and peripheral equipment.

General

The Anna is controlled by a frequency converter and incorporates monitoring of both the HEPA filter and other pressure drops. The frequency converter also controls the CIP system (optional) and monitors the drive belt.

Startup and checking the direction of rotation

Pre-start checks

- Make sure that the machine is installed in accordance with the instructions
- Check that all screws have been tightened
- Check that the electrical connections are secure and not damaged

Checking the direction of rotation

The rotors must rotate in the right direction for the machine to function correctly.
The following problems may occur if the rotors of a machine rotate in the wrong direction:

- Impaired or non-existent suction power
- Risk of the drive belt jumping off

Check by removing the service hatch and starting the oil mist separator. The correct direction of rotation is indicated by a marker on the motor, see Fig. 7.

Remove the service hatch by undoing the two nuts under the hatch, then angle the hatch outwards while pulling down at the same time.
Check that the motor fan is rotating in the direction indicated by the marker.
Contact support if it is rotating in the wrong direction.

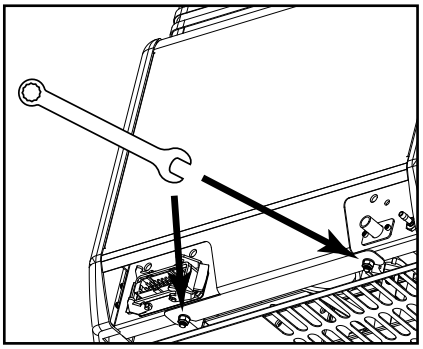


Fig. 5 Hatch screws

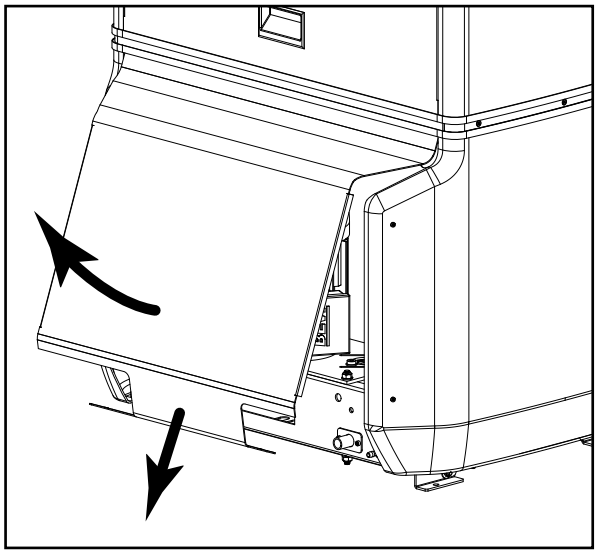


Fig. 6 Removal of service hatch

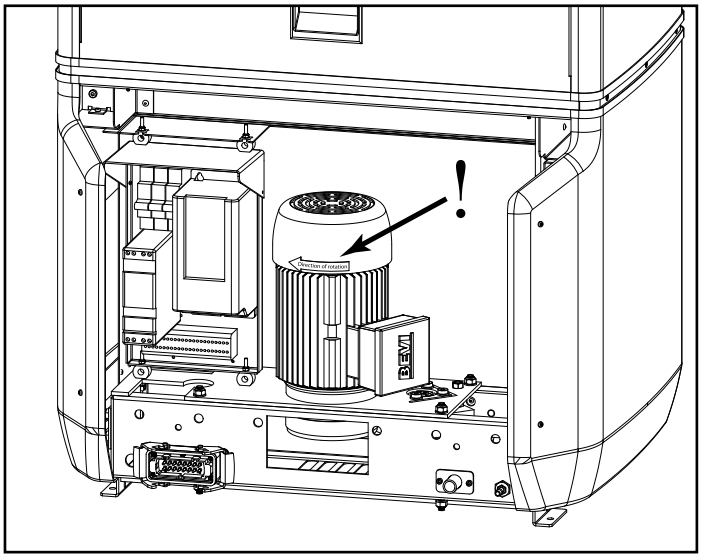


Fig. 7 Arrow showing the direction of rotation

Operation of Anna

The Anna's control electronics are integrated behind the service hatch and controlled via a separate control box (see Fig. 8).

The control box has a rotary switch for operation of the oil mist separator. It also has space for an additional rotary switch for controlling the CIP (optional).

Fig. 8 Control box

1 Manual operation

Start the machine by turning the switch to "I".
The LED strips will light up green during startup and operation. It normally takes approx. 30 seconds to start up.

2 Automatic operation

If the rotary switch is set to "AUTO", the Anna will start upon command from the machine tool. Stopping and starting are controlled by breaking or closing a circuit in the machine tool.

Status indication, Anna

The Anna has a status indication system. LED strips on the front and back display various coloured lights which flash at different rates depending on the machine status. The control system measures the flow and pressure drop over the HEPA filter and calculates the filter's degree of filling and other flow limitations.

Normal operation is indicated by a green strip. See the "Service and Maintenance" section for a description of the various error codes and status indicators.

Service and maintenance

DANGER!

It is extremely important that the machine and the rotors have stopped completely before any work on the machine commences. The oil mist separator contains several rotating components which can cause injuries to personnel. Switch off the power and wait five minutes before opening the machine.

DANGER!

Switch off the power and disconnect the electrical plug prior to working on the machine.

Regular maintenance

The need for maintenance depends on the application. Maintenance mainly consists of cleaning the machine of accumulated materials. If CIP is installed, this can be used for cleaning.

- Regularly check the machine's screws and bolts and tighten as required.
- Check the motor cable and the rest of the electrical installation for damage etc.

Annual preventive maintenance

Performed together with periodic maintenance and consists of the following parts:

- Ensuring that the machine is working normally without vibration or leaks.
- Once a year the machine's inlet and outlet tubes must be dismantled and the channels inspected and cleaned.

Cleaning the machine

The need for cleaning depends on the application. Deposits may accumulate on the machine's interior walls and on the outside of the rotor.

- If the machine is equipped with the Advanced control system, the operating program has an integrated washing cycle. See the description of the control system for additional information about these functions.
- Check that the exit pipe for separated oil is not clogged up with refuse and deposits. If necessary, clean with water and a brush.
- Dismantling of the rotor for cleaning may only be performed by a qualified technician approved by 3nine. Contact 3nine for more information.

WARNING!

Do not push hoses etc into the machine inlet when the machine is operating – foreign bodies can damage the rotor.
If high pressure washing is used, pump pressure may not exceed 120 bar and the water may not be hotter than 50 °C.

English

Servicing the rotor

Warning!

All work on the rotor and its components requires in-depth knowledge and may only be performed by an expert technician approved by 3nine. Incorrect repairs may risk damage to the machine and are not covered by warranties.

Servicing and maintenance

Cleaning with integrated washing cycle

The easiest way to clean the oil mist separator is using the washing cycle which is performed automatically every time the machine is switched off without the power being cut. The machine can also perform a washing cycle upon startup. Parameter 18.32 controls the number of times the rotor changes direction when starting up the machine.
The default setting is zero, i.e. no washing cycle upon startup.

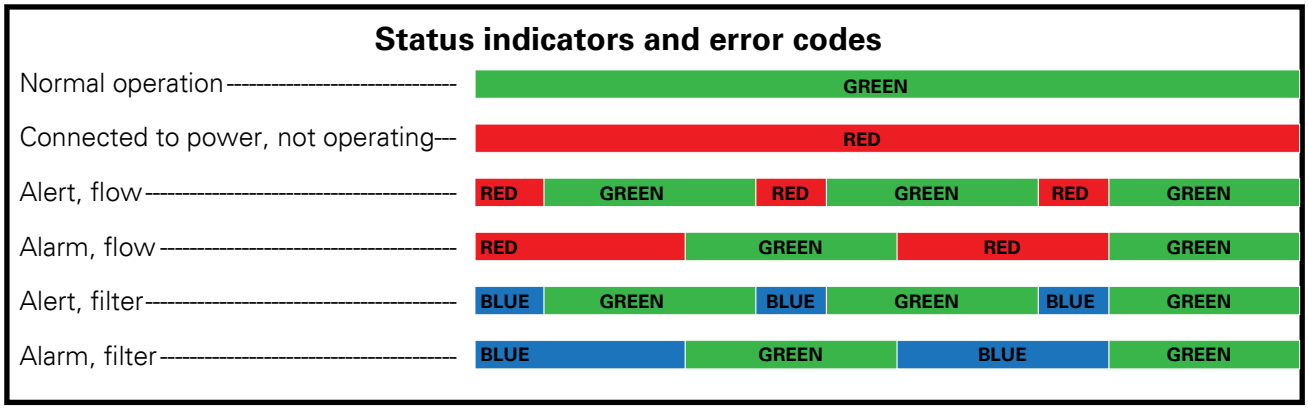
Status indicators and error codes

The LED strips on the front and back of the oil mist separator display various coloured lights which flash at different rates depending on the machine status.

Changing between green and blue indicates that the HEPA filter is starting to be clogged. 3-second blue is an alert and 30-second blue is an alarm. When an alert is shown, the machine tool may start to leak oil mist. The machine tool should be examined and the filter replaced if this is the case. If an alarm is displayed, the filter is so clogged that in most cases it will cause the machine tool to leak oil mist.

Changing between green and red indicates that the flow in the oil mist separator is failing for a reason un-related to the HEPA filter. Check that nothing is hindering the flow, e.g. a clogged protective net on the machine tool or a blocked pipeline to the oil mist separator. If no other flow limitations are found, the oil mist separator's grooved packet must be inspected. Alerts are indicated by three-second red, and alarms are indicated by 10-second red.

Failed operation is indicated by red, e.g. if the machine is not switched on or has been switched off due to a fault, e.g. lost belt (underload, error code FT.17 on the frequency converter) or overload (error code FT.01). See the frequency converter manual for identification of other faults.



English

Programming the frequency converter

The oil mist separator has integral electronics with a frequency converter. The frequency converter is programmed to control the motor and CIP and monitor the belt, filter and other pressure drops. Some parameters that control these functions can be adjusted. These can be found under function block 18.

The frequency converter is programmed by pressing "Back Reset" and the up or down arrow until "P" is displayed. Press "OK" and use the arrows to get to the right parameter. Only alter parameters 18.2-18.5 and 18.32 and NO others. To return the converter to the default setting, press "Back Reset" and then the up or down arrow until "S" is displayed, then press "OK" and arrows until "P4.2" is displayed, then press "OK" and the arrows to change "0" to "1", and finish by pressing "OK".

CIP

General

CIP (Cleaning In Place), a system for flushing the oil mist separator, is used to prevent deposits on the rotor and other machine parts. Flushing normally takes place using the cutting fluid for the machine tool. All flushing results in a small amount of very small drops which are difficult to separate and will affect the HEPA filter. Therefore, do not flush more than necessary. Grinding, machining of cast iron and application of a small amount of fluid will require more flushing.

The oil mist separator has integrated control of CIP (Cleaning In Place). If the machine is equipped with a CIP valve/pump, this is controlled from the frequency converter. CIP is normally (default setting) activated via parameter 18.2, which then has a value of 1. If CIP has to be disabled temporarily, this can be done by setting parameter 18.2 to 0. The CIP system normally flushes for 5 seconds every 10 minutes. The time in seconds between each flush (default setting 600 s) is set by parameter 18.3.
The flushing time in seconds (default setting 5 s) can be set with parameter 18.4.

When the oil mist separator is switched off, the CIP system runs a washing cycle. The oil mist separator then reduces its revolutions and changes direction three times (the number of times is setting using parameter 18.5) at the same time as the oil mist separator is flushed clean.
A washing cycle can also be performed upon startup. The number of directional changes is controlled by parameter 18.32. The default setting is zero, i.e. no washing cycle upon startup.

Changing the HEPA filter

If the filter gets clogged it must be replaced to ensure the continued correct functioning of the oil mist separator.

The Anna is equipped with an integrated pressure gauge and indicates by means of the LED strip when it is time to change the filter.

1. Ensure that the machine is switched off and that the rotors have stopped completely.
2. Remove the hatch (A) by undoing the two quarter-turn screws (B) on the top of the hatch. Then remove the hatch by pulling it up out of its groove and then outwards.
3. Undo the filter by turning the two locking levers (C) so that they point straight up.
4. Pull out the old filter. Note that the gasket may sometimes get stuck to the base and it may be necessary to pry the filter upwards to release the gasket.
5. You can lubricate the contact surface of the gasket with Vaseline to facilitate installation of the new filter. Ensure that the filter is pushed in until it stops. Lock the filter by turning the locking levers back to horizontal position.
6. Refit the hatch and start the oil mist separator.

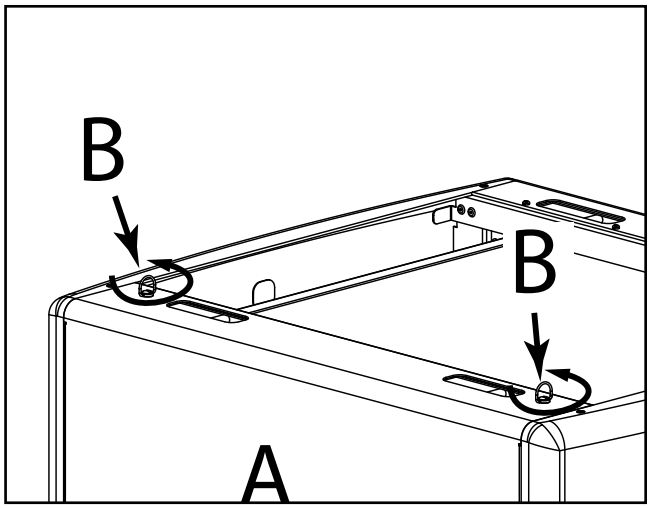


Fig. 9 Locking screws

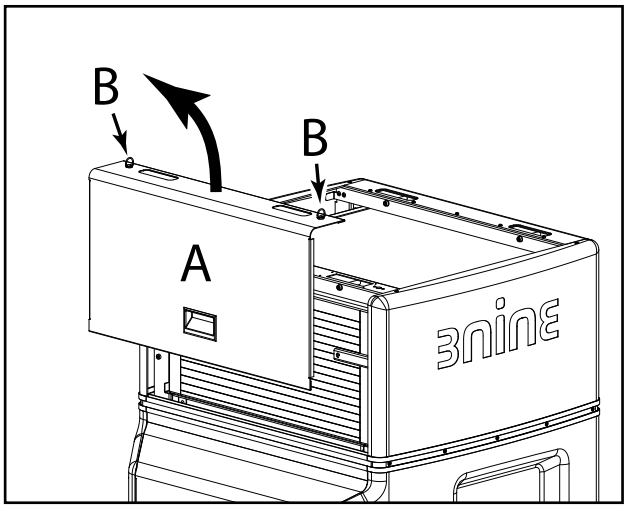


Fig. 10 Removal of hatch

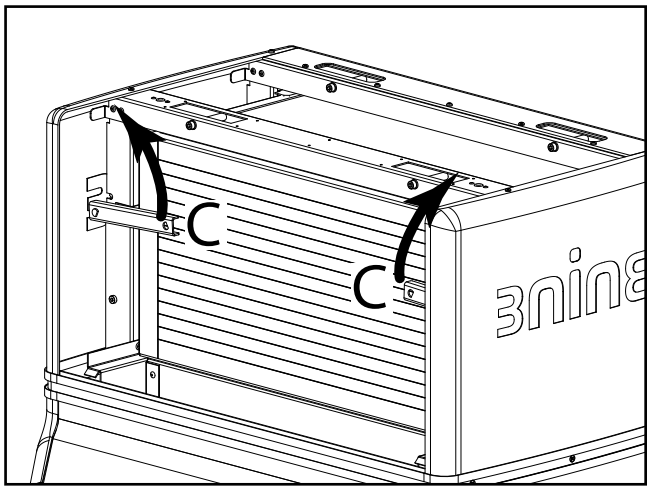


Fig. 11 Locking levers

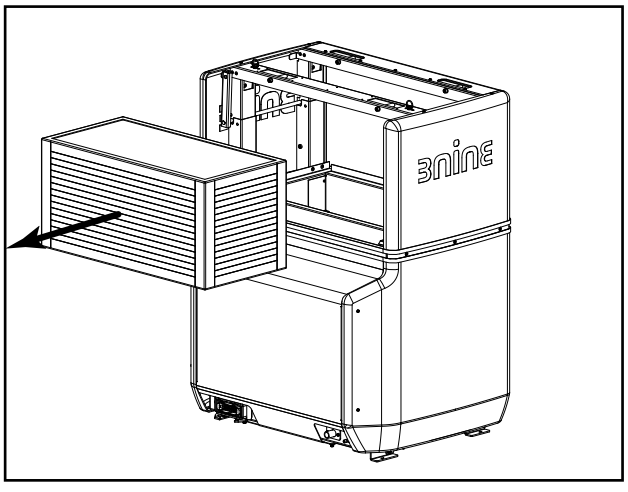
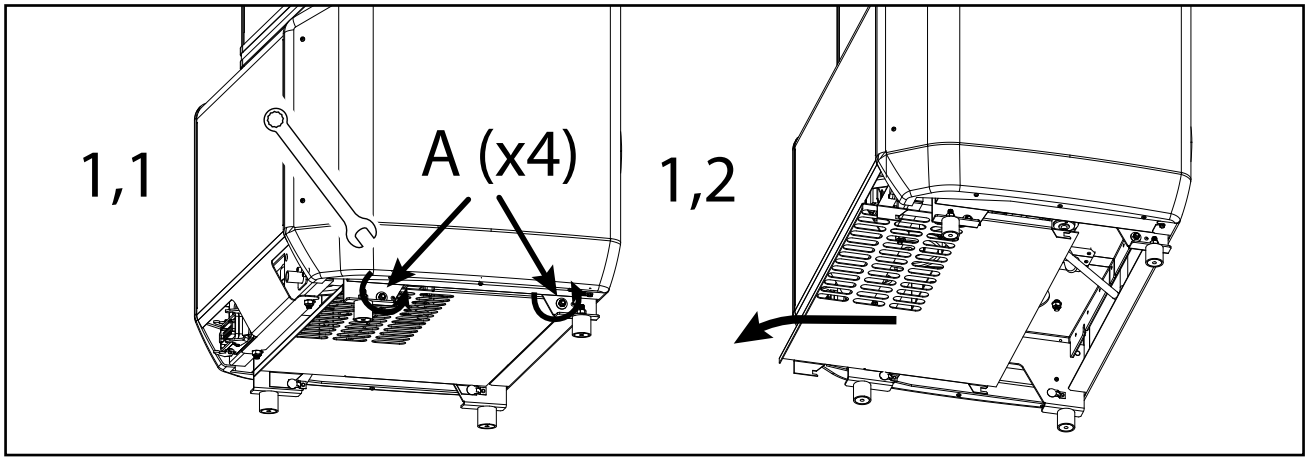


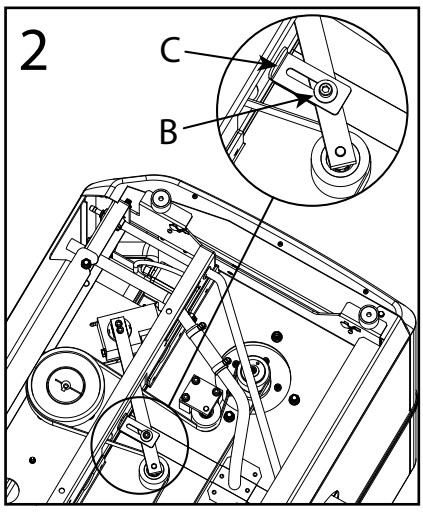
Fig. 12 Filter

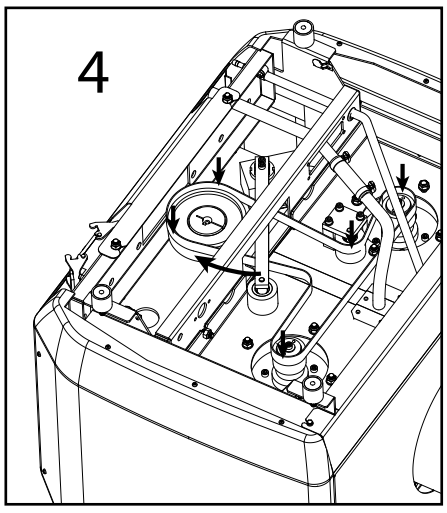
Changing the drive belt

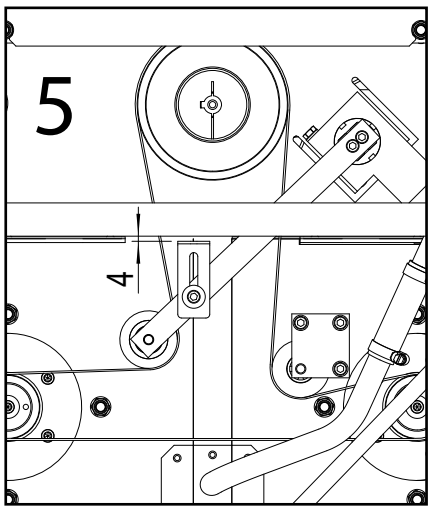
The oil mist separator's rotors are driven by means of a drive belt. If the drive belt needs to be replaced, the belt protection plate below the machine needs to be removed.
Note: it may be necessary to slightly loosen the entire oil mist separator from its rubber feet in order to create enough space for removal of the plate.

1. The plate is secured with four attaching screws, two on either side, which do not need to be removed. Loosening the nuts (A) by a few turns will suffice to release the protective plate. When the nuts are loosened, the plate can be pulled towards the motor and then removed.
2. It may be necessary to remove the belt tensioner arm stop to be able to relieve the pressure on the belt tensioner and so facilitate fitting of the belt. Undo the screw (B) and remove the screw and stop angle (C).
3. Remove the old belt.
4. Fit the new belt. Where necessary, relieve the tension on the belt tensioner with one hand to facilitate fitting. Rotate the motor pulley a few turns to allow the belt to "settle" over the pulleys. It is not necessary to centre the belt particularly carefully over the pulleys: as the pulleys are cambered, the belt will attempt to centre itself when the machine is started.
5. Refit the belt tensioner arm stop angle.
6. Push the belt transmission's protective plate back into position and tighten the nuts on the side.
7. Start the machine and check that the belt automatically centres itself over the pulleys.









Troubleshooting chart

Problem	Possible cause	Remedial action
1. The machine fails to start	No power supply	Ensure that the power is connected and the main fuse is intact
	Rotating parts are touching non-rotating parts	Check the machine. Rectify is possible. If not contact a 3nine service.
2. The machine vibrates violently/emits abnormal noise	Imbalance in rotor	Inspect the rotor/rotors via inlet. Large quantities of grime and solid particles can cause imbalances. Clean as required.
	Loosen the screwed connection.	Tighten the screwed connection
	Damage to motor or rotor bearing	Contact 3nine service
3. Changed oil output	Clogged up oil exit.	Clean exit
	No air flow through the machine	See point 6
	Rotor/ rotors not rotating	See under point 1. Check drive belt
4. The machine stops	Motor fuse was triggered or power supply interrupted	Check there are no foreign bodies in the inlets and outlets. Check that rotor/rotors are running freely
5. Insufficient separation	The machine stops	See under point 1 above
	Machine working above its capacity due to faulty installation	Contact 3nine service
	Rotor rotating in the wrong direction	Check marking and reconnect motor phases if necessary
	Clogged up oil exit	Clean exit
6. Low or no air flow	Machine is clogged up	Check for possible clogging in the inlet pipe or inside the machine. Clean as required
	The HEPA filter is clogged	Change filter
	Rotor/ rotors not rotating	See under point 1. Check drive belt
7. Strong flow of fluid from exit pipe	The CIP flow is too high	Check the functioning of the CIP unit and its settings
	The CIP flow is too high	Check that the constant flow valve il (1.6 l/min) is installed
8. Rotor or rotors rotating abnormally slowly	Frequency converter setting wrong	Check that the frequency converter has been set correctly
9. Error code for frequency converter	Electrical fault	Check the frequency converter manual Contact 3nine service

Notes

Contact information

Sweden:

3nine AB
P.O Box 1163
SE-131 27 Nacka Strand
Visiting address: Cylindervägen 12

Phone +46 (0)8 601 35 40
Fax +46 (0)8 601 35 41
E-mail: info@3nine.com
Reg.number 556572-4167

Deutschland:

3nine GmbH
Geheimrat-Hummel-Platz 4
65239 Hochheim/Main

Tel. 06146-83 77 99-0
Fax 06146-83 77 99-39
Amtsgericht Wiesbaden HRB 21910

USA:

3nine USA Inc.
28730 S. River Rd
Catoosa, OK 74015

Office: +1-918-266-0113
Fax: +1-918-512-4250